

Glossary of Terms

Activated Carbon	A form of carbon with a fine porous structure, which makes it highly adsorbent and therefore effective in removing organic or inorganic compounds from water or gas.
Adsorption	The attraction and adhesion of a layer of molecules from a liquid or gas to the solid surface with which it is in contact.
Air stripping	Air is blown upwards through a falling column of contaminated water. The air 'drives off' the contaminants from the water, producing a dilute air stream containing organic vapours. This occurs in a structure called a stripping column.
Algae	Simple organisms containing chlorophyll which live in aquatic habitats, or in locations with sufficient moisture on land.
Ambient	Existing conditions to which people, plants and animals are exposed.
Amphipod	Small crustaceans, also known as freshwater shrimps, that feed by 'browsing' i.e. moving over the surface of the sediment, consuming organic matter as they go.
Anticyclone	Meteorological term, meaning winds spiralling out from a centre of high pressure.
Aquifer	An underground geological formation that contains water and is capable of yielding water to a well or spring; a water bearing formation.
Artefact	Man-made object.
Arterial road	Road which carries traffic from one region to another, forming principal avenues of conveyance for metropolitan traffic movements.
Atmospheric stability	Refers to the atmosphere's ability to mix and disperse a plume (or emission of gas).
Asphyxiant	A gas or mixture which can displace the oxygen in an environment such that respiration (breathing) cannot be supported.
Basel Convention	A convention at which Australia ratified an international treaty for the control of trans-border movements of hazardous wastes and their disposal.
Benthic	Relating to the bottom of a water body such as a river, sea, lake or estuary.
Bioaccumulation	The build-up of a substance in the body of a living organism.
Biochemical Oxygen Demand (BOD)	A measurement of how much oxygen will be directly consumed by a particular sample of water through biological processes.
Biodiversity	The variety of life forms, the different plants, animals and micro-organisms, the genes they contain and the ecosystems they form.
Bioregion	A territory defined by a combination of biological, social and geographical criteria rather than by geopolitical considerations; generally, a system of related, interconnected ecosystems.
Bioremediation	Removal of organic contamination by utilising naturally occurring or specifically engineered or introduced bacteria.
Biota	Animal and plant life in a region.
Biotic	Involving biological activity.
Botany Groundwater Cleanup Project	A group of activities, including the GTP, which Orica is undertaking to prevent contaminated groundwater flowing to Penhryn Estuary and Botany Bay, in order to meet the requirements of the NCUA.
Botany Industrial Park (BIP)	The BIP is occupied by various companies, including Orica, which have manufacturing facilities or operations there.
Bund	A structure consisting of a base and walls designed to contain spillage/leakage from stored liquid materials, typically installed around storage

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	tanks.
Cadastral	Showing property boundaries.
Catchment	The entire land area from which water (e.g. rainfall) drains to a specific watercourse or waterbody.
Central EDC Plume	Composed of one plume (C1) which consists predominantly of EDC with concentrations greater than 5,000 mg/L in the core of the plume, inferred to originate from the former EDC storage tanks on the BIP.
Chlorinated Hydrocarbon (CHC)	CHC is a generic term given to a range of chemical compounds, composed of chlorine, hydrogen and carbon. The groundwater below the BIP and nearby areas has been contaminated with CHCs. The main CHC contaminants in the groundwater are ethylene dichloride (EDC), carbon tetrachloride (CTC), tetrachloroethylene (PCE), trichloroethylene (TCE) and vinyl chloride (VC).
Commissioning	The final stage of the construction phase, comprising a series of tests and adjustments to demonstrate the required performance of equipment prior to handover to the operator.
Cone Penetration Test (CPT)	Test involving a 35 mm diameter rod with a cone tip being pushed into the ground, and measuring the end bearing resistance on the cone and the friction resistance on a separate sleeve behind the cone. The measurements can be compared to empirical charts to derive an interpretation of the stratigraphic sequence (i.e. layers of different soil and rock types) through which the cone tip has penetrated.
Confined aquifer	An aquifer whose upper and/or lower boundaries are confined by an impermeable geologic formation.
Decommissioning	The final stage of a development, involving the ceasing of operations, and the dismantling, removal and disposal of its component parts.
Dense Non-Aqueous Phase Liquid (DNAPL)	DNAPLs are denser-than-water liquids, such as chlorinated hydrocarbon (CHCs), that may exist as interconnected droplets in the soil and/or groundwater. These substances are not very soluble in groundwater, so may exist for a long time slowly contaminating passing groundwater.
'De novo' synthesis	Chemical reaction through which chemicals such as dioxins and furans can be formed by the recombination of destruction products following the destruction of chlorinated hydrocarbons in a thermal oxidiser.
Deposition	The build-up, over time, of a material in the air as it settles out of the air (e.g. onto soil).
Drawdown	A lowering of the water table of an unconfined aquifer or the potentiometric surface of a confined aquifer caused by pumping from wells.
Dioxins	Dioxins and furans are halogenated aromatic hydrocarbons. There are 75 different dioxins, or polychlorinated dibenzodioxins (PCDDs), and 135 different furans, or polychlorinated dibenzofurans (PCDFs). Each different form is known as a 'congener'. They are Persistent Organic Pollutants, which can bioaccumulate in the body, potentially leading to cancer.
Ecosystem	An interdependent system of interacting plants, animals and other organisms together with the non-living (physical and chemical) components of their surroundings.
Ecologically Sustainable Development	Development that aims to meet the needs of the present community without compromising the ecological processes on which life depends for the benefit of future generations.
EDC	Ethylene dichloride or 1,2-dichloroethane. The most common contaminant in the Botany groundwater. A manufactured chemical used commonly as a solvent and also used to make VC (vinyl chloride monomer) from which PVC (a common plastic) is manufactured.

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Eight Part Test	A test to analyse the significance of potential impacts of proposed developments on threatened species, populations and communities and/or their habitats as specified under Section 5A of the <i>Environmental Planning and Assessment Act 1979</i> .
Emergency Response	Reaction by trained personnel and/or emergency services to an accident or emergency.
Endangered Species	Those plants and animal species likely to become extinct unless action is taken to remove or control the factors that threaten their survival.
Endemic	Species that naturally occurs in only one area or region.
Environmental Impact Assessment	Formal and systematic evaluation of a proposal, to assess potential impacts on the environment and identify management measures to minimise such impacts
Environmental Management Plan	Control, training and management measures to be implemented in the construction and operation phases of a project in order to avoid, minimise or mitigate potential environmental impacts.
Ex situ	External to the location. In the groundwater cleanup context, ex situ means cleanup of the water not in the ground.
Equipotential	A line in a two dimensional groundwater flow field such that the total hydraulic heads (or pressures) are equal for all points along the line.
Fauna	The entire animal life of a region.
First-Flush	The first runoff water after rain over a defined surface.
Flora	The entire plant life of a region.
Foraging	Searching for food.
Fugitive Emissions	Emissions released to the air other than those from stacks or vents.
Geotechnical	Relating to the form, arrangement and structure of the geology
Greenhouse Challenge	Launched in 1995. A joint voluntary initiative between the Federal Government and industry to abate greenhouse gas emissions.
Greenhouse Effect	Predicted global climate change resulting from build-up of certain gases, such as carbon dioxide, within the Earth's atmosphere, trapping heat from the sun, increasing global temperatures
Greenhouse Gas	A gas that increases the atmosphere's ability to trap heat, rather than lose the heat to space.
Groundwater	Groundwater is the general term for water in the ground. Underground water bodies are known as aquifers.
Groundwater Embargo Area	Previously known as Groundwater Protection Zone 2. The area has been declared by DIPNR as a combined buffer zone around the exclusion area and incorporates localities with known or suspected contamination from past industrial activity.
Groundwater Extraction Exclusion Area	An area around the known contamination plumes originating from the BIP (previously known as Groundwater Protection Zone 1). Within this area DIPNR has declared that no groundwater extraction should take place (unless with DIPNR's permission) until further notice.
Heritage	A term referring to Aboriginal and colonial archaeological sites and material remains.
Huntsman Corporation Australia Pty Ltd	Manufacturer of surfactants located on the BIP.
Hydrology	The study of the behaviour of water in the atmosphere, on the surface of the earth and underground.
Hydrogeology	Scientific considerations relating to geological formations, soil, surface water,

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	and especially groundwater.
Hydraulic conductivity	A coefficient of proportionality describing the rate at which water can move through a permeable medium (e.g. an aquifer).
Hydraulic containment	Measures taken to lower the potentiometric surface and/or water table and effect hydraulic capture of the contaminant plume. The use of a line of extraction wells pumping water out of the ground to form an effective barrier. This stops the groundwater moving past the barrier and contains the plumes.
Hydraulic gradient	The change in total head in an aquifer, with the change in distance in a given direction. The steeper the 'slope' of the groundwater, the faster it should flow.
Infiltration	The process of water entering the soil.
Infrastructure	Basic structure of fixed capital items to support the operation of a facility, e.g. roads, drains, utilities (water, gas).
In situ	In the context of groundwater cleanup, this refers to performing the cleanup in the ground.
Inter-generational equity	Principle whereby the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
Isotainer	A bulk liquids tank container (typically 20 m ³) designed to prevent spills or leaks during frequent transport movements through robust design. Designed to fit standard ISO (International Standards Organisation) sizes for transport containers.
Key Threatening Process	As defined under Section 220F of the Fisheries Management Act 1994 as a process that 'adversely affects two or more threatened species, populations or ecological communities or causes the listing of a species, population or ecological community as threatened'.
Lamella filter	A filter made up of a series of inclined plates designed to assist in the sedimentation (settling) of particles from solution.
L _{A90}	Noise level exceeded for 90% of the 15 minute interval.
L _{eq}	Equivalent continuous sound level in dB(A), i.e. the constant sound level that has the same acoustic energy as the original fluctuating noise for the same period of time.
Lithology	The geological (physical) character of a rock or soil.
Maximum ground level (MGL) concentration	The maximum predicted concentration of a species, measured (or calculated) at ground level, at any position in the region of investigation.
Megawatt-hour	A unit of energy equal to one million watts of power operating for one hour.
Mollusc	Invertebrae having a soft unsegmented body usually enclosed in a shell i.e. oyster, mussel
Northern Plume	Comprises five separate plumes (N1, N2, N3, N4 & N5) consisting predominantly of EDC with maximum concentrations between 100 mg/L and 200 mg/L originating from the northern end of the BIP.
Off-gas	Gas containing VOCs generated by the air stripping process, and is treated in the thermal oxidiser.
Performance indicator	A comparison of actual conditions with a specific set of reference conditions. They measure the 'distance(s)' between the current environmental situation and the desired situation (target): 'distance to target' assessment.
Persistent	A chemical which doesn't break down in the environment into safe chemicals.
pH	Measure of alkalinity or acidity of an aqueous solution.
Paleochannel	Ancient river or drainage feature which has been infilled by younger sediments.

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Phytoplankton	Free-floating microscopic organisms suspended in the water column. They produce organic material by photosynthesis and are responsible for a large proportion of primary productivity in the ocean.
Piezometer	A well with a short slotted screen for measuring a potentiometric surface or elevation of the water table. Also used for collecting groundwater samples at a discrete depth.
Plume (atmospheric)	The trail leading from a source as it disperses through the atmosphere, like from a smoke stack.
Plume (groundwater)	A mass of contaminated water extending outward from the source of the contamination, similar to smoke from a smoke stack.
PM ₁₀	PM ₁₀ refers to that fraction of total suspended particulates with an aerodynamic diameter smaller than 10 µm (10 microns, or one hundredth of a millimetre).
Potentiometric surface	An imaginary surface representing the total head (or pressure) of groundwater and defined by the level to which water will rise in a well.
Primary Containment Area (PCA)	The Primary Containment Area is defined in the NCUA as Block 2 of Orica Southlands.
Project Area	The land extending from the north of the BIP to Penrhyn Estuary and Foreshore Beach.
Qenos Pty Ltd	Joint venture company formed by the merging of the polyethylene businesses of Exxon Mobil and Orica.
Quenching	In the context of the thermal oxidiser, the rapid reduction in temperature by the addition of large quantities of liquid by spraying it into a hot gas. The cooling primarily occurs through the evaporation of the liquid.
Ramsar	Australia is a contracting party to the Ramsar Convention on wetlands. This obliges us to designate and protect wetlands of international significance.
Reactive Iron Barrier	In situ technology for the treatment of chlorinated solvents and other contaminants in groundwater via chemical reduction
Recharge	The addition of water to an aquifer.
Remnant vegetation	A small fragmented portion of the former dominant vegetation which once covered the area before being cleared for human land use.
Reverse Osmosis	A process for the removal of dissolved ions from water in which pressure is used to force the water through a semi-permeable membrane which will transmit the water but filter out most other dissolved materials.
Riparian	Riverine. Pertaining to a river bank.
Scrubbers	Equipment that washes a gas stream with liquid to effect the removal of a substance from the gas. For the off-gas oxidiser, the gas from the thermal oxidiser (after hydrogen chloride removal in the acid absorbing column) is scrubbed with a caustic soda solution to remove residual hydrogen chloride and chlorine.
Secondary Containment Area (SCA)	The area defined in the NCUA as “the location where the EPA approved contaminant containment works upgradient of Botany Bay and Penrhyn Estuary, for the interception and containment of contaminant plumes that have migrated or may migrate beyond the primary containment area, are carried out”.
Section 90 Permit	Approval under the National Parks and Wildlife Act, regarding consent to knowingly destroy, deface or damage, or knowingly cause or permit such damage to an Aboriginal artefact or place.
Steam stripping	Steam is injected through the groundwater and used to ‘drive off’ the contaminants from the groundwater, and then condensed into a liquid for

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	subsequent disposal/destruction.
Sound Power Level	Logarithmic measure of the sound power in comparison to the reference level 0 dB.
Southern Plumes	Comprised of three separate plumes (S1, S2 & S3) inferred to be derived from the former Solvents Plant and the former TCE Plant.
Spoil	Soil available for use in earthworks.
Spot height	The elevation (in m AHD) of a point on a map.
Stockholm Convention	An international treaty to which all signatory parties would phase out the use and manufacture of persistent organic pollutants including dioxins and furans.
Stratigraphy	The distribution, deposition and age of rock and soil strata.
Sub-arterial road	Road which connects arterial roads to areas of development or carry traffic directly from one part of a region to another.
Subsidence	Movement of a structure due to change in the structural properties of the underlying material. The change in groundwater level could lead to movement (collapse) of the soil.
Substation	A premises where high-voltage supply is converted, controlled or transformed
Sustainable Use	The use of an organism, ecosystem or renewable resource at a rate within its capacity for renewal
Temperature inversion	A temperature inversion is a meteorological phenomenon where warm air gets trapped beneath cold air, preventing circulation within the atmosphere.
Terrestrial	Of, or pertaining to the land
Thermal oxidation	Process of oxidising materials by raising the temperature of the material in the presence of oxygen, and maintaining it at a high temperature for sufficient time to complete a reaction to carbon dioxide and water (and HCl where chlorinated hydrocarbons are present in the gas stream).
Threatened species	A generic term for a plant or animal generally considered as vulnerable or endangered under various threatened species conservation laws. It is used to indicate that there is some level of threat as to the species viability in the wild.
Topographic	Generally refers to a map showing lines of equal height (contours).
Toxicity	The degree to which a substance is harmful to human health.
Volatile Organic Compound (VOC)	Organic chemical with sufficiently low vapour pressure to become a gas at room temperature.
Water balance	A method of reconciling all volumes entering or leaving a region, the root zone, or the groundwater system.
Water column	A hypothetical cylinder of water from the surface of a water body to the bottom and within which physical and chemical properties can be measured.
Water table	The top of the saturated zone where unconfined groundwater is under atmospheric pressure.
Weed	Naturalised non-indigenous plant species that is undesirable in a specific location.